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AUTHOR Chisholm, Ines Marquez; Carey, Jane; Hernandez, Anthony
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ABSTRACT

Universities assume that entering students possess computer skills and literacy and then expect students to utilize these assumed skills by offering computer-based instruction, requiring research using the World Wide Web, offering online courses, and integrating computer usage into many courses. Universities seldom stop to determine if required competencies exist uniformly across all students. Literature has shown that computer access and integration of computers into curricula have been significantly lower in student populations from ethnic minorities in K-12 public schools. This study looks at access and utilization issues of students at an urban university across students of many different ethnicities to determine if discrepancies persist at the university level. Findings in the following areas are discussed: computer skills and training; computer access--hardware; computer access--software; computer access--Internet/e-mail; current computer use; classroom computer use; and computer perspectives. Based on the findings, several changes are recommended that will expand computer ownership, training, support, and modeling of professional use of computers. (Contains numerous references.) (Author/AEF)

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Access and Utilization of Computer Technology by Minority University Students

Inés Márquez Chisholm
College of Education
Arizona State University West
USA
Ines@asu.edu

Jane Carey
School of Management
Arizona State University West
USA
jcarey@asu.edu

Anthony Hernandez
College of Arts and Sciences
Arizona State University West
USA
IGAXH@asuvm.inre.asu.edu

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Abstract

Universities assume that entering students possess computer skills and literacy. Universities then utilize these assumed skills by offering computer-based instruction, requiring research using the World Wide Web, offering online courses, and integrating computer utilization into many courses. Universities seldom stop to determine if required competencies exist uniformly across all students. Literature has shown that computer access and integration of computers into curricula have been significantly lower in student populations from ethnic minorities in K through 12 public schools. This study looks at access and utilization issues of students at an urban university across students of many different ethnicities to determine if discrepancies persist at the university level.

Introduction

As budgets shrink, student demographics change, and the demand for accountability increases, higher education confronts the urgent need for transformation. Among the institutional responses to our changing social and economic milieu is a heightened commitment to the integration of interactive technology, as both a mode of instructional delivery and as a means for student learning and performance. Our institutions have found that they must adopt "information technology to stay in business" (Barone, 1996, p. 28). In fact, institutions that do not or can not transform themselves to meet the needs of students in our technology-oriented society will not survive (Stallings, 1997).

As the technological transformation of higher education continues, the student body becomes increasingly heterogeneous. Between 1984 and 1995, the presence of ethnic, racial and linguistic minority students in higher education rose by 67.7 percent (American Council on Education, 1997). By fall 1995, 25 percent of all college students were African American, Latino, or American Indian (NCES, 1998a).

With the demographic heterogeneity on the university campus comes a diversity of background experiences and knowledge. Many traditionally underrepresented groups arrive at the university with rich personal and professional experiences and knowledge, but those experiences and knowledge may not include the computer and interactive technology. As Kruper (1996) notes, many students are

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"technophobic" and lack the background and skills to fulfill computer-related assignments. Moreover, access to technology is not only a matter of access to hardware and software, but also to the use, training, experiences, and varied applications of technology.

Though home ownership computers increased by 11.4 percent nationally, reaching a new high of 40.7 percent of American households (NY Law School, 1998), the computer is still not a ubiquitous presence. National statistics illustrate the differences in computer access and experiences among students. Computer ownership in America rose 51.9 percent between 1994 and 1997; during that same period, modem ownership increased by 139 percent and email access grew 397 percent (Meeks, 1998). Computer access, however, differs across racial, ethnic, gender, economic and geographic divides. White households (40.8 percent) are more than twice as likely to own a computer than Black (19.3 percent) or Latino (19.4 percent) households (Meeks, 1998).

The increased commitment to technology in higher education and our society's growing dependence upon technology for personal, social and economic development have a tremendous potential for disenfranchising and disadvantaging these technologically-poor segments of society. If our universities and colleges hope to furnish equitable access to higher learning, then they must concern themselves with equitable access to information technology.

Research Questions

The researchers are professors at an urban, upper division institution in the western United States. The majority of the undergraduate students are transfers from the community-college system. This campus has a growing population of nontraditional, minority students and an emphasis on computer technology. The researchers are concerned about minority student academic success in an environment where computer technology is playing a growing role in academic instruction and learning. Given the inequality in public schools between upper-middleclass districts and lower socio-economic districts (which are also de facto segregated), they are particularly concerned about minority student preparation in computer technology and issues of computer ownership. The following research questions form the basis for this study:

1. Do nontraditional, low socio-economic and traditionally underrepresented college students in higher education have the same access to computers and information technology as traditional majority students?

2. Do nontraditional, low socio-economic and traditionally underrepresented college students in higher education have the same computer training and information technology background as traditional majority students?

3. Do nontraditional, low socio-economic and traditionally underrepresented college students in higher education use the same computer applications as traditional majority students?

4. What factors are associated with access and frequent use of information technology?

The Study

A stratified random sample of students was drawn from the active student population at an urban, upper-division, western university in spring of 1998. The sample was stratified by ethnicity and by college. Specific classes were randomly selected to be a part of the sample based on returning a sufficient number of students who met ethnic and major stratification criteria. The total sample size was 621 subjects. This represents more than 10% of the entire student population. After eliminating duplicate classes, the final sample size was 578. Both graduate and undergraduate students were included in the sample. The response rate was 64.2% (371 respondents).

A profile of the respondents

The majority of the respondents were older than 25 years of age (55.7%), female (62.5%), and Euro-American (64.4%). The minority ethnic representation of the respondents was African-American (3%), Native American (2.2%), Asian American (5.7%), and Hispanic American (10.5%) for a total of 77 (20.8%) minority respondents with another 37 or 10.5% who either did not choose an ethnic category or marked other. These numbers closely reflect the total student population at ASU West (2.5% African-American, 77.3% European-American, 1.6% Native American, 3.7% Asian-American, 11.8% Hispanic American, Other 3.1% and 65.6% female).

The students were asked to identify their major by the College in which their major resides. Fifty-seven (16%) respondents listed their major within the College of Arts and Sciences, one hundred six (31%) as business (School of Management - SOM), one hundred and twenty-five (36%) as College of Education, and fifty-nine (17%) as College of Human Services.

The majority of the respondents (70.6%) were enrolled in 10 or more credit hours per semester and worked over thirty hours per week (69.6%). It is interesting to note that the minority undergraduate students worked an average of 4 hours per week more than the majority undergraduate students. Although most claim English as their first language, 12.4% do not. Many are the first persons in their family to attend college (29.6%). Most rely on themselves or some means of financial aid to support their education (70.8%).

Findings

Computer Skills and Training

All but two of the subjects (both of whom are minority students) have used computers. Majority students feel more positive about their knowledge of computers (mean of 2.33 where 1 is excellent) than the minority students (mean of 2.46) ($p=.042$).

The first computer experience of majority students occurs at an earlier age than minority students and is more likely to occur at home rather than in public education settings. More than half of the majority students had their first experience with computers either at home or prior to attending community college (53.2%) compared with less than one third of the minority students (32.5%).

The respondents were asked what type of training they had received. They were allowed to mark more than one response. The responses included:1) elementary school 57, 2) middle school 70, 3) high school 123, 4) community college 203, 5) university 144, 6) self-taught 190, 7) private computer school 17, 8) correspondence course 11, 9) computer store 5, 10) friend's home 35, 11) at home 126, and 12) through work 162.

Respondents reported taking 3.02 (mean) courses about computers, and 1.6 (mean) courses about interactive multimedia. Only 25 (6.7%) of the respondents have taken courses through Technopolis. Most of those who did not take courses through Technopolis (computer access center) gave lack of knowledge of courses and their existence as the reason for not taking courses (159 or 42.8%).

When asked if they have taken a course over the Internet, 36 or 9.7% responded yes. Most of the respondents have used the Internet at some point (343 or 92.4%). The most common means for learning how to use the Internet was by exploration by oneself (231 or 62.2%)

Computer Access - Hardware

Most of the majority students own a computer (81.6%). This is higher than the national average of 40.7% of households in US (NY Law School, 1998). Although 66.2% of the minority students own

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computers (also higher than the national average), this number is significantly lower than the majority ownership rate (p=.00037). The total sample consists of both graduate and undergraduate students. When the graduate students are removed, the difference in ownership is still statistically significant (p=.00077).

Sixty-four (18%) of the respondents did not own a computer. Forty-four percent of these respondents were minority students. Seventy-five percent of students who did not own computers used those available on campus. These students used university computers an average of 6 ½ hours a week. Minority undergraduate students use computers at the university more hours per week (mean of 4.57 hours) than do majority undergraduate students (mean of 3.61 hours) (p=.044).

When asked which of the following campus computer facilities they have used, they reported the following: electronic classrooms 124 (33.4%), library computer classroom 52 (14.0%), library workstations 141 (38.0%), library multimedia computers 57 (14.4%), statistical laboratory 14 (3.7%), and tutorial lab 9 (2.43).

Computer Access – Software

Two hundred and ninety-nine (82%) of the students surveyed use the computer access center. Students are generally satisfied with the support staff. Eighty-nine percent of the students indicated receiving help with computer programs always or sometimes. Only three percent of the students indicated that they did not receive assistance. The most frequently used software packages are Microsoft Word® (81%), Netscape® (73%), Microsoft Excel® (39%), Microsoft Powerpoint® (35%) and Pine email (29%).

Those who use the computer resources at the library also reported satisfaction with library support staff. Fifty-nine percent of the students indicated receiving help with computer programs from the library staff always or sometimes. Only 2.1 indicated that they did not receive assistance.

The software resources most frequently used in library include: the online catalog (233 or 62.8%), ERIC database (133 or 35.8%), ABI/Inform (82 or 22.1%), and database from other libraries (80 or 21.6%)

Computer Access - Internet/email

Of those who own computers, 232 or 62.5% have access to email and 224 or 60.4% have access to the Internet. One hundred fifty-six (42%) use email and one hundred thirty-three (35.8%) use the Internet on a daily basis. There is no significant difference of email and internet usage between minority and majority students who own computers.

Current Computer Use

Two hundred ninety-seven or eighty percent of all the respondents use the computer on a daily basis and most (259) would use it more if they had more time. Most of these are Microsoft Windows® users (311 or 84%) and use the Microsoft Office® suite of software on a regular basis.

Classroom Computer Use

Most of the respondents reported that their college courses required them to use the computer "a lot" (228 or 61.4%) although 154 (41.5%) reported that they don't know how many computer courses their college major requires.

About one third (129 or 34.7%) wished that they were required to take more computer courses in their major course of study. It is interesting to note than that most subjects reported that their professors do not use computers in class (191 or 51.5%) while 196 or 52.8% believe that their professors use computers to manage class grades, lessons, handouts, and presentations.

Most respondents did not feel that they were well prepared to use technology (mean of 2.93 where 1 was strongly agree). Minority respondents feel less prepared (3.04) than majority respondents (2.87)

(p=.028). While they don't feel well prepared now, they seem to have confidence that they will be able to use technology in their future careers (311 or 83.8%).

Computer Perspectives

The respondents were asked a series of questions to find out how they view the issue of computer access both on and off campus and how to solve computer access issues. They believe that everyone attending ASU West has the "same opportunities to use technology" (306 or 82.3% marked highly agree or agree). It appears that most respondents interpreted this question as relating to usage while actually on the ASU West campus although the question is rather vague in this regard. An even greater majority support student loans to help buy computers (318 or 85.7%) and believe scholarships should provide money to buy or rent computers for home use (316 or 85.1%). Fewer respondents support "loaner" computers to be borrowed from the university on a semester by semester basis (252 or 70%).

Conclusions

1. The first computer experience of majority students occurs at an earlier age than minority students and is more likely to occur at home rather than in public education settings.

2. Computer ownership is unequal. Minority students own computers at a lesser rate than do majority students. This difference holds true even when the graduate students are removed from the sample.
3. The computer access center and other computer resources at the university are more likely to be used by minorities. These students are also more likely to be satisfied with the level of help they receive while using university resources.

4. Students use the same applications regardless of ethnicity. Minority and majority students who own computers are as likely to have access to the Internet and email.

5. All students, regardless of ethnicity do not feel well prepared in the use of technology. They also do not see their professors using technology in the classroom and some wish that they were required to use computers more in their major courses.

Recommendations

As we increase the number of asynchronous courses, the amount of computer- and internet-supported coursework, and the use of email for student-to-student and faculty-student communication, we need to consider the impact of these computer-related changes on individual students and faculty. The findings of this study suggest some areas that need to be addressed if universities are to implement technology integration and applications that are fair and equitable for all students.

This study reveals that minorities are less likely to own computers, are apt to have their first experience with a computer later in their lives, and express less confidence in their knowledge of computers than majority students. Clearly, then, as we move toward greater use of technology for instruction and coursework, we need to take proactive measures to ensure that some students are not unfairly disadvantaged. Based on our findings, we recommend several changes that will expand computer ownership, training, support, and modeling of professional use of computers.

1. **Computer ownership**- although most students in our survey own a computer, the largest proportion of those who do not own a computer are minority students and the most frequent reason given for non-ownership was financial. Thus to increase home computer ownership by these students, universities must find ways to provide computers for students who cannot afford them.
2. **Computer training** - since minority students and other nontraditional students expressed less confidence in their computer knowledge and most had their first encounter with computers at the community college or university, there is an apparent need for further

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computer training and opportunities to use computers. Therefore, campus-wide minimal technology competencies should be established. These competencies should then be assessed both upon entry and just prior to exit. Appropriate training for individual students could then be determined on the basis of identified need.

3. **Computer Support**- expand support services to students. Also the hours that the computer access center is available must be expanded to meet student needs.
4. **Modeling of computer use** - the presence of technology in higher education does not guarantee quality in scholarship, teaching or learning. As with other human tools, its effectiveness relies upon the skill and knowledge of the user and upon its application to appropriate tasks. If we want our students to become computer competent and to feel well prepared to use technology, then they must see how computers can be used in their chosen profession and observe many of its applications in use. By implication, then, faculty need to feel confident in their own computer skills, understand its possibilities as an educational tool, and find value in its use. Yet, respondents to our survey overwhelmingly indicated that they had not seen their instructors making use of computers in class.

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Additional references may be found at http://www.west.asu.edu/jcarey/site99.